

Knowledge**Base:**

## Mining and Mine Processing

Setting the standard with safe, reliable electrical products, people, procedures and proficiencies – delivering advantage you can use every day.

**COOPER** Crouse-Hinds





## Understanding mining challenges to deliver mining solutions.



Put a century of standard-setting experience to work for you.




### **Cooper Crouse-Hinds understands mining realities.**

Mining is an unforgiving business. To avoid the unacceptable cost of downtime, you must meet critical challenges and anticipate the unexpected every day:

- Equipment must perform in harsh, wet conditions
- Employee safety is vital above ground, underground and in processing facilities
- There is no margin for error





For more than a century, companies have come to rely on Cooper Crouse-Hinds for value they can trust to grow their business. By integrating a comprehensive line of reliable electrical products with expert support, industry insights, and local availability, we enhance safety and productivity in the most demanding industrial and commercial environments worldwide. This philosophy is at the core of every product we develop and every solution we engineer.

### **Reliability successful mines count on**

Partnering with Cooper Crouse-Hinds and our dedicated team of mining industry experts can help you succeed. Since 1897, we have led the development of safer, more reliable ways to power the most challenging harsh and hazardous areas, including:

- Products that are engineered and manufactured to perform through temperature variations in mines and mine processing plants
- Exceptionally durable, corrosion-proof products that withstand extreme abuse and exposure to chemicals, water, and high vibration areas
- Certified hazardous location products that are proven to perform in mining environments where ignitable gases or combustible dusts are present

### **Knowledge and experience to find better ways**

We can help engineer out cost and time with:

- Products that install faster, require fewer parts and deliver superior performance
- Low maintenance choices, like longer lasting lamp options and more durable parts that require fewer man-hours of service each month
- Dedicated and expert sales support to help select products that perform reliably and cost effectively

### **A commitment to safety and productivity**

The Cooper Crouse-Hinds KnowledgeBase for Mining and Mine Processing is helping more mine owners, operators and engineers succeed each day – safely and cost effectively. It's part of our commitment to focus KnowledgeBase on industries where our experience, expertise and products can make the biggest impact.

# It's about knowing your challenges inside-out.

**Focused on safety, application, and ease of use.**

This illustration represents a combination of metal, non-metal, and coal processes, including above ground, underground and ore processing. It demonstrates some of the many ways Cooper Crouse-Hinds can help you optimize performance and safety, while reducing risk and inefficiency. We understand that every mine presents unique challenges and opportunities, and we customize commercial off-the-shelf solutions for each mining customer.

## Industrial

Areas prone to dust, dirt, grime, vibration, hard use and abuse

## Wet Location: NEMA Type 4, IP56

Protection from windblown dust and rain, splashing and hose-directed water and external formation of ice

## High Vibration

Where equipment with high speed moving parts may require maintenance/repairs

## Corrosive Areas

From chemicals, atmospheres and water

## Space Constraints

Areas with low ceilings, tight spaces and limited footprint potential

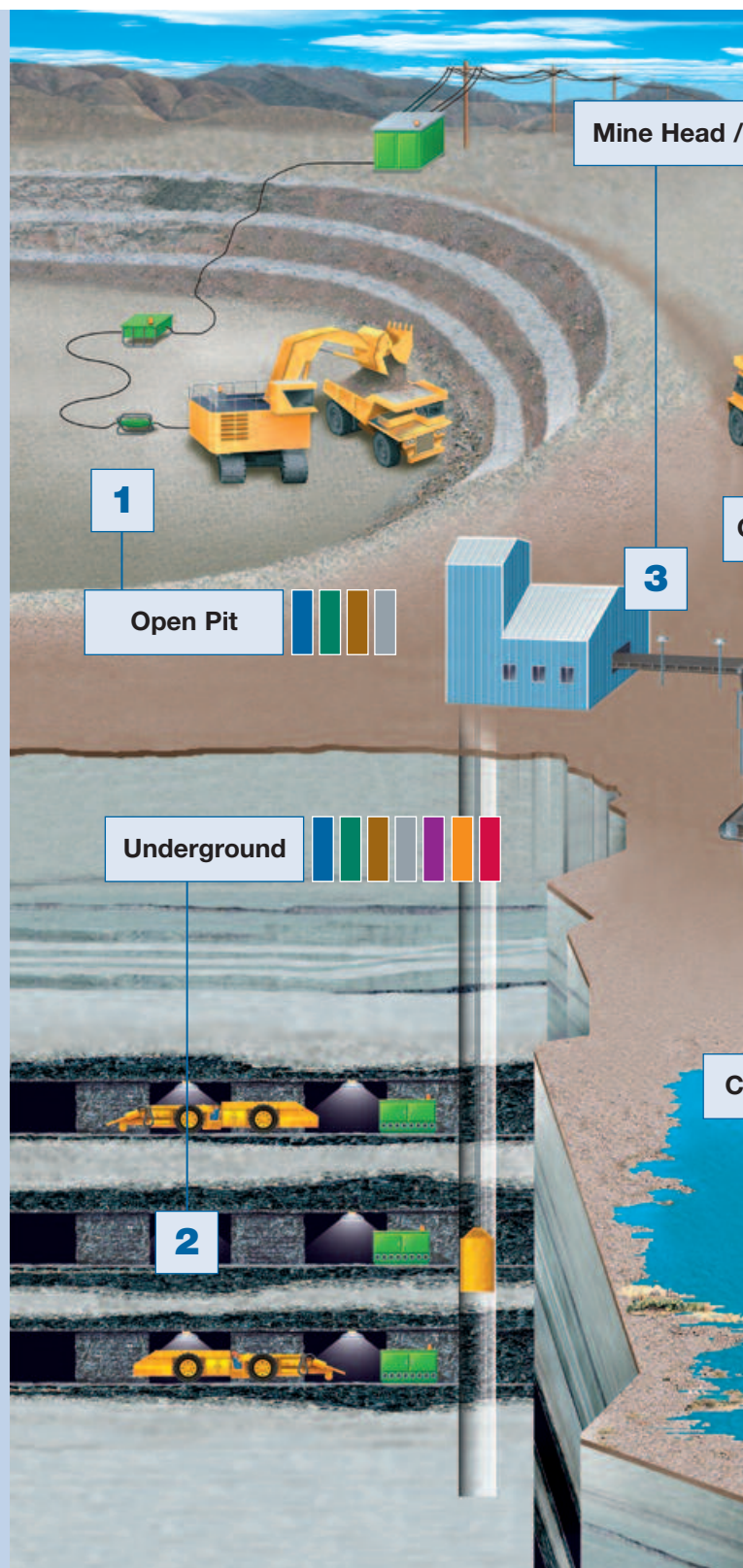
## Class II Locations\*

Areas where dust-ignitionproof or dust-tight equipment might be needed depending on the conditions

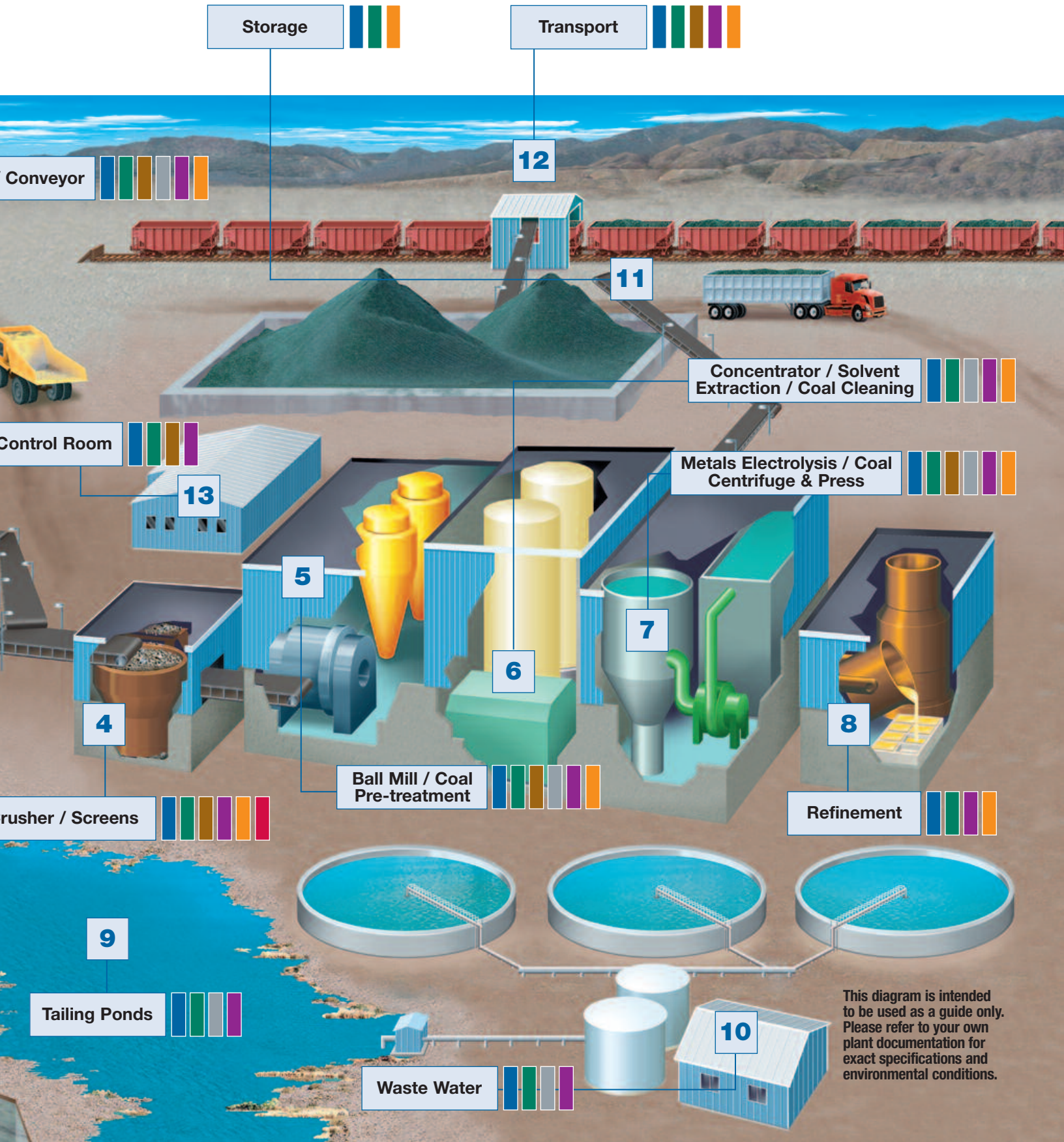
## Class I Locations\*

Explosion protection for areas with flammable gases or vapors in the atmosphere

\* Includes products for classified areas under either Division or Zone system.









# Products powering advantage in mining.

## Cooper Crouse-Hinds understands mining.

Our electrical, lighting, wiring, control and automation products have helped successful companies at nearly every turn in the mining process, including:

- Material removal – above or below ground
- Material transportation – raw or finished
- Processing
- Refining
- End-product delivery
- Waste material treatment

Whether you're in the metal, ore, or coal mining markets, we can help you manage costs and maintain margins, optimizing the value of your investments, including:

- Drillers and breakers
- Crushers
- Screens
- Mineral processing machinery
- Material transportation
- Handling equipment

The experienced professionals at Cooper Crouse-Hinds can help you make smarter investments in your business. So you can reduce cost, improve quality, and extend equipment life cycles, helping to ensure the safety of your employees.








## Here's what our products can do for you.

With more than 100,000 proven, quality products, your Cooper Crouse-Hinds Mining KnowledgeBase team has more options than anyone else in the business. From the harsh and hazardous categories we invented and continue to lead, to innovative lighting and safety

products, we can help make you more competitive. Using the Mining Illustration as a reference, the following product pages list possible environmental conditions and mining application locations.

## Plugs and Receptacles:

Rugged construction, extensive configurations, custom capabilities and numerous interlocked designs define Cooper Crouse-Hinds as the leading source for NEC and IEC Plugs and Receptacles that provide safe and reliable solutions for fixed and portable power applications in industrial and hazardous environments.

	Product Solutions	Env. Conditions	Plant Location
	<b>ENR &amp; ENP Dead Front Interlocked Plugs and Receptacles</b> offer a factory-sealed chamber that encloses the potential arcing components between two explosionproof threaded joints – no additional seals are required. A one-piece molded gasket seals the cover plate and ENP plug, providing full environmental protection at the receptacle face. Molded-in contact design provides superior interior contact reliability and a top-hinged cover design with 45° downward angle provides superior protection in damp, wet, and dirty locations.	<div>Industrial</div> <div>Wet Locations</div> <div>Space Constraints</div> <div>Class II Locations</div> <div>Class I Locations</div>	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
	<b>Nonmetallic Arktite® Plugs &amp; Receptacles</b> with Krydor® construction offer corrosion resistance for long life. A unique patented strain relief design prevents stress from reaching wire terminations at the contacts. Sealing gaskets at all critical points inside Arktite plugs and receptacles protect against dust, dirt, mud, water and corrosive contaminants. Arktite nonmetallic plugs and receptacles are keyed for a perfect match in the molded one-piece insulator housing. Available for 30, 60, & 100A service with a complete choice of wire termination methods, and completely interchangeable with all comparably rated metallic Arktite products.	<div>Industrial</div> <div>Wet Locations</div> <div>Corrosive*</div> <div>Space Constraints</div>	3, 4, 5, 6, 7, 8, 10, 11, 12
	<b>Metallic Arktite Plugs and Receptacles</b> with copper-free aluminum construction feature an arc-snuffing design that enables large power loads to be disconnected under load without causing an arc flash in the area. A gasketing system delivers unsurpassed watertight integrity (NEMA 4) and Uni-Shell™ construction provides superior strength in abusive environments. The Tri-Lock™ cord grip has three clamps which provide even gripping and superior cord clamping. The split pin contact design offers 360° of contact to reduce heat rise and eliminate arcing. They are completely interchangeable with all comparably rated nonmetallic Arktite products.	<div>Industrial</div> <div>Wet Locations</div> <div>Space Constraints</div>	3, 4, 5, 6, 7, 8, 11, 12
	<b>WSR/WSRD Interlocked Arktite Receptacles</b> with enclosed disconnect switches are used as a service outlet for portable or fixed electrical equipment. The enclosure, handle, and other exterior parts are corrosion resistant. For maximum safety, the spring door receptacle at the bottom of the unit is mechanically interlocked with the switch operating mechanism. The switch cannot be closed until the plug is fully inserted and the plug cannot be withdrawn or inserted unless the switch is open. With the switch open, accidental plug withdrawal is prevented by the interlock mechanism. Withdrawal can only be accomplished by activation of the interlock release lever located on the receptacle.	<div>Industrial</div> <div>Wet Locations</div> <div>Corrosive*</div>	3, 4, 5, 6, 7, 8
	<b>FSQC Arktite Interlocked Receptacles</b> are constructed of heavy-duty, cast aluminum that will provide years of trouble-free operation in some of the most demanding operating environments. These interlocked receptacles and switches, mating with APJ/NPJ plugs, provide a great solution to portable electrical applications in a harsh mine environment. The FSQC assemblies have safety features preventing contact to be made or broken under load and when plug and receptacle are not engaged properly.	<div>Industrial</div> <div>Wet Locations</div> <div>Corrosive*</div> <div>Class II Locations</div> <div>Class I Locations</div>	3, 4, 5, 6, 7, 8, 9, 10

\* In nonmetallic

## Fittings:

Time-tested, innovative conduit fittings, cord connectors and cable glands from Cooper Crouse-Hinds move power where you need it simply and safely in any electrical installation.

	Product Solutions	Env. Conditions	Plant Location
	<b>Cable Glands / Connectors</b> are used to terminate cables into enclosures for motor control and electrical distribution. The gland forms a watertight seal, provides ground continuity of cable armor, and prevents pullout protection that exceeds CSA requirements. These glands are rated for indoor and outdoor locations and for vertical or horizontal cable runs. Their compact design allows for quick and easy installation and is ideal for the mining processes.	<div>Industrial</div> <div>Wet Locations</div> <div>Corrosive*</div> <div>Space Constraints</div> <div>Class II Locations</div>	1, 3, 4, 5, 6, 7, 8, 10, 11
	<b>CGB Cord and Cable Fittings</b> provide means for passing cord or cable into an enclosure or through a bulkhead, while forming an environmental seal. They are typically used with portable cord and types MV (unarmored), PLTC, SE (round), TC and UF cables.	<div>Industrial</div> <div>Wet Locations</div> <div>Space Constraints</div> <div>Class II Locations</div> <div>Class I Locations</div>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
	<b>Form 7 and Form 8 Conduit Outlet Bodies</b> for pulling conductors and providing openings for making splices and taps. Form 7 and Form 8 Condulet® outlet bodies approach conduit in size – for neat, compact installations. Covers have wedgenut attachments that provide clear, unobstructed cover openings. Covers with integral sealing gaskets reduce installation time and costs.	<div>Industrial</div> <div>Wet Locations</div> <div>Space Constraints</div>	3, 4, 5, 6, 7, 8, 10, 12, 13
	<b>FS/FD Cast Iron Boxes</b> are used where wiring devices or special arrangements of conduit hubs or entrances are required. FS/FD bodies have standard hub arrangements or can be custom drilled to specifications. Boxes are available in single, two, three, four and five gang and two gang tandem bodies.	<div>Industrial</div> <div>Wet Locations</div>	3, 4, 5, 6, 7, 8, 9, 10
	<b>EYS, EYD, EZS, EZD Sealing Fittings</b> are used indoors or outdoors to restrict the passage of gases, vapors, or flames from one portion of the electrical installation to another. Integral bushings in the conduit hubs protect conductor insulation from damage, and large openings provide easy access for making dams. These sealing fittings may be installed in vertical or horizontal positions, and they are typically used throughout coal mining facilities.	<div>Industrial</div> <div>Class II Locations</div> <div>Class I Locations</div>	3, 4, 5, 6, 7, 8, 9, 10
	A revolutionary alternative to our time-tested Chico sealing compound, <b>Chico® SpeedSeal™ Compound</b> fills an entire sealing fitting, automatically separating conductors. It eliminates the time-consuming and tedious task of packing fiber to separate conductors. It reduces a 50-minute operation to 5 minutes, saving considerable labor on every sealing fitting installed.	<div>Industrial</div> <div>Class II Locations</div> <div>Class I Locations</div>	3, 4, 5, 6, 7, 8, 9, 10

\* With TMC-K Series Cold Shrink™ Corrosion Protection Kit











## Industrial Lighting:

Advanced lighting technology, expert Cooper Crouse-Hinds support, global certifications and an unmatched selection of proven solutions combine to deliver superior illumination, increased safety and the lowest possible cost of ownership in the most demanding industrial and hazardous location applications.

	Product Solutions	Env. Conditions	Plant Location
	<b>LED Task Light Hazardous Location Luminaire</b> delivers up to 60,000 hours of targeted white light in a corrosion-resistant watertight package for years of maintenance-free operation. This compact light fixture delivers similar light output at a fraction of the energy to many lower wattage HID fixtures. The enclosure contains an integral silicone gasket and corrosion resistant hardware for the most demanding environments. An ideal light for illuminating equipment and pathways where general room or area lighting is insufficient.	Industrial Wet Locations High Vibration Corrosive Space Constraints Class I Locations	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	The versatile <b>Champ® Industrial Lighting Family</b> delivers a broad range of wattages, lamp sources, compliances, optics and accessories. These luminaires are ideal in areas where ignitable concentrations of flammable gases or vapors will be present due to abnormal, unusual or accidental conditions or combustible dust.	Industrial Wet Locations Corrosive Class II Locations Class I Locations	1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13
	<b>Champ-Pak™ Wall Pack</b> is the first low-profile wall pack designed specifically for hazardous areas. These wall-mounted luminaires are suitable for any area with adverse conditions such as dust, dirt, moisture, vibration, high pressure hose down and high thermal ambient. The precise design of its glass refractor minimizes fixture depth while providing uniform glare-free illumination.	Industrial Wet Locations Corrosive Space Constraints Class II Locations Class I Locations	1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13
	The <b>Champ® FMV Floodlight Family</b> offers industry-leading ease of installation features, including a removable ballast tray, prewired with terminal blocks, and substantial room for wiring. These floodlights provide wide, powerful beams in a variety of lamp sources and wattages, and come with a continuous silicone gasketing that ensures wet location rating integrity.	Industrial Wet Locations Corrosive	1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13
	<b>Vaporgard™ Series Incandescent Luminaires</b> are used indoors or outdoors in industrial locations requiring enclosed and gasketed fixtures due to moisture, dirt, chemicals, vibration or rough usage. Their instant-on capability makes them ideal for building entrances. Instead of time-consuming screws, a shock-absorbing socket strap is keyhole slotted and removes quickly for easier wiring.	Industrial Wet Locations High Vibration Class I Locations	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	<b>EVM Hazard-Gard® Factory-wired HID Luminaire</b> feeds power through a “wireless” connection block which serves as a mechanical seal between conduit and ballast compartments. This eliminates the need for an external, field-installed seal for faster installation.	Industrial Wet Locations Corrosive Space Constraints Class II Locations Class I Locations	2, 4, 5, 6, 7, 8, 10
	<b>MEDC Visual and Audible Signaling Devices</b> are designed specifically for harsh environments where durability is essential and there is a risk of explosion. They help you communicate better, regardless of the conditions, to keep your equipment and personnel safe.	Industrial Wet Locations Corrosive Space Constraints Class II Locations Class I Locations	1, 3, 10, 11, 12
	<b>Light-Pak™ N2LPS &amp; ELPS Emergency Lighting</b> systems provide reliable illumination during power failures. They are ideal for wet or corrosive conditions, where the presence of combustible dust or easily ignitable fibers and flyings is commonplace.	Industrial Wet Locations Corrosive Space Constraints Class I Locations	3, 4, 5, 6, 7, 8, 9, 10, 11, 12

## Control & Apparatus:

Innovative, intelligent NEC and IEC Control and Apparatus solutions from Cooper Crouse-Hinds safely and efficiently control power and protect circuits in explosive, wet and corrosive environments worldwide.

	Product Solutions	Env. Conditions	Plant Location
	<b>AFA and AFU Conveyor Belt Control and Alignment Switches</b> are used as an emergency or normal "STOP" switch for conveyor belts whenever they become misaligned or run off their tracks due to excessive speed, uneven load, leveling or breakage. The AFA and AFU Series are gasketed for use in hose down areas, even when combustible dusts are present.	Industrial Wet Locations High Vibration Corrosive Space Constraints Class II Locations Class I Locations	1, 3, 11, 12
	<b>AFC*, AFK*, AFM*, AFS*, AFH* Mine Signal Switches</b> are the perfect solution to use in non-hazardous areas of mines or process industry facilities where a rugged enclosure is needed for protection from dripping water, falling ore, and other materials. This series offers a significant labor savings since no tools are required, there are no screws to remove, and no wiring will be disturbed during inspection or replacement of internal units.	Industrial Wet Locations High Vibration Space Constraints	1, 2, 3, 11, 12
	<b>N2S Krydon® Control Stations</b> provide superior protection in corrosive and hazardous environments. Their tough Krydon fiberglass-reinforced polyester material lasts longer and is specially formulated to resist damage from heat, ultraviolet rays, and impact. They come with factory-sealed devices suitable for Class I, Div. 2 hazardous installations.	Industrial Wet Locations High Vibration Corrosive Space Constraints Class II Locations	4, 5, 6, 7, 8, 10
	<b>GHG43 Series Control Stations</b> are now available with both GRP nonmetallic or 316L stainless steel enclosures, making them ideal for corrosive and harsh conditions within mine site operations. This complete control station offering is available with a variety of devices, including pushbuttons, control switches and pilot lights.	Industrial Wet Locations High Vibration Corrosive Space Constraints Class II Locations Class I Locations	4, 5, 6, 7, 8, 10
	<b>EJB Junction Boxes</b> are used in threaded rigid conduit systems as a junction or pull box, providing enclosures for splices and branch circuit taps or for housing terminal blocks, relays and other electrical devices. They are rated for damp, wet, dusty, corrosive and hazardous locations. They are ideal in applications with frequent or heavy rain, water, spray, moisture and humidity.	Industrial Wet Locations Class II Locations Class I Locations	2, 4, 5, 6, 7, 8, 10
	<b>EDS and EFS Factory-sealed Control Stations and FlexStation™ Components</b> improve safety and reduce installation time and cost by eliminating the need for an external sealing fitting. These factory-sealed control devices are available in pushbutton, selector switch and pilot light configurations.	Industrial Wet Locations Class II Locations Class I Locations	3, 4, 5, 6, 7, 8, 10, 12, 13
	<b>EBMC Combination Motor Starter and Circuit Breaker Enclosures**</b> are made of rugged, corrosion-resistant, cast, copper-free aluminum. They offer simple, straightforward installation of breakers and starters on a pre-drilled mounting plate. A neoprene gasket permanently attached to the cover seals out moisture. Versatile internal operating mechanisms allow for field adjustment to accommodate popular starters and breakers.	Industrial Wet Locations Corrosive Class II Locations Class I Locations	1, 4, 5, 6, 7, 8, 11, 12
	<b>EIB and EID Compact Circuit Breaker and Disconnect Assemblies</b> are an innovative line of explosionproof motor controls that use an EJB enclosure with a Cutler-Hammer™ circuit breaker. They are available with or without the breakers installed and accommodate breakers from 15 to 100A. An integral cover gasket maintains NEMA 3, 3R, and 4 ratings.	Space Constraints Class II Locations Class I Locations	5, 6, 7, 8, 9, 10, 11, 12
	<b>PowerPlus™ Size D (D2L/EPL) Panelboards</b> provide mining customers with the ideal solution for the protection of lighting and heat tracing circuits. These panelboards are tailored toward simplicity of installation, ease of maintenance, nearly infinite configurations for numerous applications and reliable peace-of-mind performance.	Industrial Wet Locations Corrosive Class II Locations Class I Locations	3, 4, 5, 6, 7, 8, 9, 10






\* Canadian Made

\*\* EBM Enclosures with Motor Starters or Circuit Breakers are also available.



## Interconnect:

Interconnect solutions you can trust in the most challenging conditions. Interconnect designs and fabricates engineered solutions that offer the best value to the mining industry.

Product Solutions	Env. Conditions	Plant Location
 <p><b>Quik-Loc® Connector Series</b> was designed for service under the most severe mining conditions. Constructed of resilient neoprene components and neoprene covered alloy castings, they are watertight, corrosion resistant, and extremely tough. Quick disconnect and Lever Loc functionality make them easy for a one-man operation. MSHA certification on selected products.</p>	<div>Industrial</div> <div>Wet Locations</div> <div>Corrosive</div> <div>Space Constraints</div>	1, 2
 <p><b>Limberollers® Belt Conveyor Idlers</b> use only two bearings per idler, one located at each end of the shaft. The idler is self-cleaning and its continuous contact with the belt helps prevent uneven belt wear. It is lightweight, readily handled by one person, has superior belt alignment and is non-static.</p>	<div>Industrial</div> <div>Wet Locations</div> <div>High Vibration</div> <div>Corrosive</div> <div>Space Constraints</div>	1, 2, 11, 12
 <p><b>Oval Connectors</b> are available in a number of combinations so that they may be adapted to almost any requirement. In addition to mating plugs and plugs with safety chains, receptacles are available with covers and a wiring box. Its extremely rugged neoprene construction will absorb maximum punishment and its oval shape permits it to lay flat, creating minimum obstruction in work areas.</p>	<div>Industrial</div> <div>Wet Locations</div> <div>High Vibration</div> <div>Corrosive</div> <div>Space Constraints</div>	7, 13
 <p><b>Round Connectors</b> are a broad line of tough, compact, molded-to-cable connectors for a wide range of power and control applications that require a quick disconnect. These connectors withstand physical abuse, seal against water, dust, and contaminants, and are easily installed.</p>	<div>Industrial</div> <div>Wet Locations</div> <div>High Vibration</div> <div>Corrosive</div> <div>Space Constraints</div>	7, 13
 <p><b>Cam-Lok® Welding Products</b> – The F-Series, originally known as Fibre Series, are low-resistance, general purpose welding connectors. Now made of reinforced thermoplastic, they provide longer life under the rigors of heat treating and stress relieving applications. The J-Series features synthetic rubber insulators of one-piece construction – the ultimate in connector technology. For use in difficult welding environments, they are splash-tight and shatter-resistant with built-in strain relief.</p>	<div>Industrial</div> <div>Wet Locations</div> <div>High Vibration</div> <div>Corrosive</div> <div>Space Constraints</div>	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

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